

Delicate Balance of Terror

The Delicate Balance of Terror

Albert Wohlstetter

P-1472

6 November 1958

Revised December 1958

I. INTRODUCTION

The first shock administered by the Soviet launching of Sputnik has almost dissipated. The flurry of statements and investigations and improvised responses has died down, leaving a small residue: a slight increase in the schedule of bomber and ballistic missile production, with a resulting small increment in our defense expenditures for the current fiscal year, a considerable enthusiasm for space travel, and some stirrings of interest in the teaching of mathematics and physics in the secondary schools. Western defense policy has almost returned to the level of activity and the emphasis suited to the basic assumptions which were controlling before Sputnik.

One of the most important of these assumptions -- that a general thermonuclear war is extremely unlikely -- is held in common by most of the critics of our defense policy as well as by its proponents. Because of its crucial role in the Western strategy of defense, I should like to examine the stability of the thermonuclear balance which, it is generally supposed, would make aggression irrational or even insane. The balance, I believe, is in fact precarious, and this fact has critical implications for policy. Deterrence in the 1960's will be neither inevitable nor impossible but the product of sustained intelligent effort, attainable only by continuing hard choice. As a major illustration important both for defense and foreign policy, I shall treat the particularly stringent conditions for deterrence which affect forces based close to the enemy, whether they are U.S. forces or those of our allies, under single or joint control. I shall comment also on the inadequacy as well as the necessity of deterrence, on the problem of accidental outbreak of war, and on disarmament.[1]

II. THE PRESUMED AUTOMATIC BALANCE

I emphasize that requirements for deterrence are stringent. We have heard so much about the atomic stalemate and the receding probability of war which it has produced, that this may strike the reader as something of an exaggeration. Is deterrence a necessary consequence of both sides having a nuclear delivery capability, and is all-out war nearly obsolete? Is mutual extinction the only outcome of a general war? This belief, frequently expressed by references to Mr. Oppenheimer's simile of the two scorpions in a bottle, is perhaps the prevalent one. It is held by a very eminent and diverse group of people -- in England by Sir Winston Churchill, P. M. S. Blackett, Sir John Slessor, Admiral Buzzard and many others, in France by such figures as Raymond Aron, General Gallois and General Gazin, in this country by the titular heads of both parties as well as almost all writers on military and foreign affairs, by both Henry Kissinger and his critic, James E. King, and by George Kennan as well as Mr. Acheson. Mr. Kennan refers to American concern about surprise attack as simply obsessive,[2] and many people have drawn the consequence of the stalemate as has Blackett, who states: "If it is in fact true, as most current opinion holds, that strategic air power has abolished global war, then an urgent problem for the West is to assess how little effort must be put into it to keep global war abolished." [3] If peace were founded firmly on mutual terror and mutual terror on symmetrical nuclear powers, this would be, as Churchill has said, "a melancholy paradox;" nonetheless a most comforting one.

Deterrence, however, is not automatic. While feasible, it will be much harder to achieve in the 1960's than is generally believed. One of the most disturbing features of current opinion is the underestimation of this difficulty. This is due partly to a misconstruction of the technological race as a problem in matching striking forces, partly to a wishful analysis of the Soviet ability to strike first.

Since Sputnik, the United States has made several moves to assure the world (that is, the enemy, but more especially our allies and ourselves) that we will match or overmatch Soviet technology and, specifically, Soviet offense technology. We have, for example, accelerated the bomber and ballistic missile programs, in particular, the intermediate-range ballistic missiles. The problem has been conceived as more or better bombers -- or rockets; or Sputniks; or engineers. This has meant confusing deterrence with matching or exceeding the enemy's ability to strike first. Matching weapons, however, misconstrues the nature of the technological race. Not, as is frequently said, because only a few bombs owned by the defender can make aggression fruitless, but because even many might not. One outmoded A-bomb dropped from an obsolete

bomber might destroy a great many supersonic jets and ballistic missiles. To deter an attack means being able to strike back in spite of it. It means, in other words, a capability to strike second. In the last year or two there has been a growing awareness of the importance of the distinction between a "strike-first" and a "strike-second" capability, but little, if any, recognition of the implications of this distinction for the balance of terror theory.

Where the published writings have not simply underestimated Soviet capabilities and the advantages of a first strike, they have in general placed artificial constraints on the Soviet use of the capabilities attributed to them. They assume, for example, that the enemy will attack in mass "over-the-Arctic" through our Distant Early Warning line, with bombers refueled over Canada -- all resulting in plenty of warning. Most hopefully, it is sometimes assumed that such attacks will be preceded by days of visible preparations for moving ground troops. Such assumptions suggest that Soviet leaders will be rather bumbling or, better, cooperative. These are best called "Western-preferred-Soviet strategies." However attractive it may be for us to narrow Soviet alternatives to these, they would be low in the order of preference of any reasonable Russian planning war.

III. THE QUANTITATIVE NATURE OF THE PROBLEM AND THE UNCERTAINTIES

In treating Soviet strategies it is important to consider Soviet rather than Western advantage and to consider the strategy of both sides quantitatively. The effectiveness of our own choices will depend on a most complex numerical interaction of Soviet and Western plans. Unfortunately, both the privileged and unprivileged information on these matters is precarious. As a result, competent people have been led into critical error in evaluating the prospects for deterrence. Western journalists have greatly overestimated the difficulties of a Soviet surprise attack with thermonuclear weapons and vastly underestimated the complexity of the Western problem of retaliation.

One intelligent commentator, Richard Rovere, recently expressed the common view: "If the Russians had ten thousand warheads and a missile for each, and we had ten hydrogen bombs and ten obsolete bombers," ... "aggression would still be a folly that would appeal only to an insane adventurer." Mr. Rovere's example is plausible because it assumes implicitly that the defender's hydrogen bombs will with certainty be visited on the aggressor; then the damage done by the ten bombs seems terrible enough for deterrence, and any more would be simply redundant. This is the basis for the common view. The example raises questions, even assuming the delivery of the ten weapons. For instance, the targets aimed at in retaliation might be sheltered and a quite modest civil defense could hold within tolerable limits the damage done to city targets by ten delivered bombs. But the essential point is that the weapons would not be very likely to reach their targets. Even if the bombers were dispersed at ten different points, and protected by shelters so blast resistant as to stand up anywhere outside the lip of the bomb crater -- even inside the fire ball itself -- the chances of one of these bombers surviving the huge attack directed at it would be on the order of one in a million. (This calculation takes account of the unreliability and inaccuracy of the missile.) And the damage done by the small minority of these ten planes that might be in the air at the time of the attack, armed and ready to run the gauntlet of an alert air defense system, if not zero, would be very small indeed compared to damage that Russia has suffered in the past. For Mr. Rovere, like many other writers on this subject, numerical superiority is not important at all.

For Joseph Alsop, on the other hand, it is important, but the superiority is on our side. Mr. Alsop recently enunciated as one of the four rules of nuclear war: "The aggressor's problem is astronomically difficult; and the aggressor requires an overwhelming superiority of force."^[4] There are, he believes, no fewer than 400 SAC bases in the NATO nations alone and many more elsewhere, all of which would have to be attacked in a very short space of time. The "thousands of coordinated air sorties and/or missile firings," he concludes, are not feasible. Mr. Alsop's argument is numerical and has the virtue of demonstrating that at least the relative numbers are important. But the numbers he uses are very wide of the mark. He overestimates the number of such bases by more than a factor of ten,^[5] and in any case, missile firings on the scale of a thousand or more involve costs that are by no means out of proportion, given the strategic budgets of the great powers. Whether or not thousands are needed depends on the yield and the accuracy of the enemy missiles, something about which it would be a great mistake for us to display confidence.

Perhaps the first step in dispelling the nearly universal optimism about the stability of deterrence would be to recognize the difficulties in analyzing the uncertainties and interactions between our own wide range of choices and the moves open to the Soviets. On our side we must consider an enormous variety of strategic weapons which might compose our force, and for each of these several alternative methods of basing and

operation. These are the choices that determine whether a weapons system will have any genuine capability in the realistic circumstances of a war. Besides the B-47E and the B-52 bombers which are in the United States strategic force now, alternatives will include the B-52G (a longer range version of the B-52); the Mach 2 B-58A bomber and a "growth" version of it; the Mach 3 B-70 bomber; a nuclear-powered bomber possibly carrying long-range air-to-surface missiles; the Dynasoar, a manned glide-rocket; the Thor and the Jupiter, liquid-fueled intermediate range ballistic missiles; the Snark intercontinental cruise missile; the Atlas and the Titan intercontinental ballistic missiles; the submarine-launched Polaris and Atlantis rockets; the Minuteman, one potential solid-fueled successor to the Thor and Titan; possibly unmanned bombardment satellites; and many others which are not yet gleams in anyone's eye and some that are just that.

The difficulty of describing in a brief article the best mixture of weapons for the long-term future beginning in 1960, their base requirements, their potentiality for stabilizing or upsetting the balance among the great powers, and their implications for the alliance, is not just a matter of space or the constraints of security. The difficulty in fact stems from some rather basic insecurities. These matters are wildly uncertain; we are talking about weapons and vehicles that are some time off and, even if the precise performances currently hoped for and claimed by contractors were in the public domain, it would be a good idea to doubt them. Recently some of my colleagues picked their way through the graveyard of early claims about various missiles and aircraft: their dates of availability, costs and performance. These claims are seldom revisited or talked about: *De mortuis nil nisi bonum*. The errors were large and almost always in one direction. And the less we knew, the more hopeful we were. Accordingly the missiles benefited in particular. For example, the estimated cost of one missile increased by a factor of over 50 -- from about \$35,000 in 1949 to some \$2 million in 1957. This uncertainty is critical. Some but not all of the systems listed can be chosen and the problem of choice is essentially quantitative. The complexities of the problem, if they were more widely understood, would discourage the oracular confidence of writers on the subject of deterrence.

Some of the complexities can be suggested by referring to the successive obstacles to be hurdled by any system providing a capability to strike second, that is, to strike back. Such deterrent systems must have (a) a stable, "steady-state" peacetime operation within feasible budgets (besides the logistic and operational costs that are, for example, problem of false alarms and accidents). They must have also the ability (b) to survive enemy attacks, (c) to make and communicate the decision to retaliate, (d) to reach enemy territory with fuel enough to complete their mission, (e) to penetrate enemy active defenses, that is fighters and surface-to-air missiles, and (f) to destroy the target in spite of any passive civil defense in the form of dispersal or protective construction or evacuation of the target itself.

Within limits the enemy is free to use his offensive and defensive forces so as to exploit the weaknesses of each of our systems in getting over any of these hurdles between peacetime operation and the completion of a retaliatory strike. He will also be free, within limits, in the Sixties to choose that composition of forces for offense, and for active and passive defense which will make life as difficult as possible for the various systems we might select. As I stressed earlier, much of the contemporary Western confidence on the ease of retaliation is achieved by ignoring the full range of sensible enemy plans. It would be quite wrong to assume that the uncertainties I have described affect a totalitarian aggressor and the party attacked equally. A totalitarian country can preserve secrecy about the capabilities and disposition of his forces very much better than a Western democracy. And the aggressor has, among other enormous advantages of the first strike, the ability to weigh continually our performance at each of the six barriers and to choose a precise known time and circumstance for attack which will reduce uncertainty. It is important not to confuse our uncertainty with his. The fact that we may not know the accuracy and number of his missiles will not deter him. Strangely enough, some military commentators have not made this distinction and have actually founded their belief in the certainty of deterrence on the fact simply that there are uncertainties.[6]

The slender basis for Western optimism is displayed not only in the writings of journalists but in the more analytic writings of professionals. The recent publications of General Gallois[7] parallel rather closely Mr. Alsop's faulty numerical proof that surprise attack is astronomically difficult -- except that Gallois' "simple arithmetic," to borrow his own phrase, turns essentially on some assumptions which are at once inexplicit and extremely optimistic about the blast resistance of his dispersed missile sites to enemy attacks from nearby.[8] Mr. Blackett's recent book, *Atomic Weapons and East-West Relations*, illustrates the hazards confronting a most able analyst in dealing with the piecemeal information available to the general public. Mr. Blackett, a Nobel prize-winning physicist with wartime experience in military operations research, mustered a lucid summary of the public information available at the time of his writing on weapons for all-out war. He stated:

"It is, of course, conceivable that some of the facts have been kept so secret that no public judgment of military policy can have any great significance; in fact, that the military authorities have up their sleeve some invention or device, the possession of which completely alters the military situation. On reflection we can see that it is fairly safe to disregard this possibility."^[9]

But unfortunately his evaluation of the use of intercontinental ballistic missiles against bomber bases shows that it was not at all safe to "disregard this possibility." Only a few pages further on, he said:

"It has recently been stated that some new method has been devised in America by which the H-bombs can be made small enough to be carried in an intercontinental missile. This seems unlikely."^[10]

Mr. Blackett's book was published in 1956. It is now widely known that intercontinental ballistic missiles will have hydrogen warheads, and this fact, a secret at the time, invalidates Mr. Blackett's calculations and, I might say, much of his optimism on the stability of the balance of terror. In sum, one of the serious obstacles to any widespread rational judgment on these matters of high policy is that critical elements of the problem *have* to be protected by secrecy. However, some of the principal conclusions about deterrence in the early Sixties can be fairly firmly based, and based on public information.

IV. THE DELICACY OF THE BALANCE OF TERROR

The most important conclusion runs counter to the indications of what I have called "Western-preferred Soviet strategies." It runs counter, that is, to our wishes. A sober analysis of Soviet choice from the standpoint of Soviet interest and the technical alternatives, and taking into account the uncertainties that a Russian planner would insure against, suggests that *we must expect a vast increase in the weight of attack which the Soviets can deliver with little warning, and the growth of a significant Russian capability for an essentially warningless attack. As a result, strategic deterrence, while feasible, will be extremely difficult to achieve, and at critical junctures in the 1960's we may not have the power to deter attack.* Whether we have it or not will depend on some difficult strategic choices as to the future composition of the deterrent force and, in the years when that force is not subject to drastic change in composition, hard choices on its basing, operations, and defense.

The bombers will continue to make up the predominant part of our force in the early 1960's. None of the popular remedies for their defense will suffice -- not, for example, mere increase of alertness, the effects of which will be outmoded by the growth of a Russian capability for attack without significant warning, nor simple dispersal or sheltering alone or mobility taken by itself, or a mere piling up of interceptors and defense missiles around SAC bases. A complex of measures is required. I shall have occasion to comment briefly on the defects of most of these measures taken singly. Let me suggest at this point the inadequacy of the popular conception of the airborne alert -- an extreme form of defense by mobility. The impression is rather widespread that one-third of the SAC bombers are in the air and ready for combat at all times.^[11] This belief is belied by the public record. According to the Symington Committee Hearings in 1956, our bombers averaged 31 hours of flying per month, which is about four percent of the average 732-hour month. An Air Force representative expressed the hope that within a couple of years, with an increase in the ratio of crews to aircraft, the bombers would reach 45 hours of flight per month -- which is six percent. This four to six percent of the force includes bombers partially fueled and without bombs. It is, moreover, only an average, admitting variance down as well as up. Some increase in the number of armed bombers aloft is to be expected. However, for the current generation of bombers, which have been designed for speed and range rather than endurance, a continuous air patrol for one-third of the force would be extremely expensive.

On the other hand, it would be unwise to look for miracles in the new weapons systems, which by the mid-1960's may constitute a considerable portion of the United States force. After the Thor, Atlas, and Titan there are a number of promising developments. The solid-fueled rockets, Minuteman and Polaris, promise in particular to be extremely significant components of the deterrent force. Today they are being touted as making the problem of deterrence easy to solve and, in fact, guaranteeing its solution. But none of the new developments in vehicles is likely to do that. For the complex job of deterrence, they all have limitations. The unvaryingly immoderate claims for each new weapons system should make us wary of the latest "technological breakthroughs." Only a very short time ago the ballistic missile itself was supposed to be intrinsically invulnerable on the ground. It is now more generally understood that its survival is likely to depend on a variety of choices in its defense.

It is hard to talk with confidence about the mid- and late-Sixties. A systematic study of an optimal or a good deterrent force which considered all the major factors affecting choice and dealt adequately with the uncertainties would be a formidable task. In lieu of this, I shall mention briefly why none of the many systems available or projected dominates the others in any obvious way. My comments will take the form of a swift run-through of the characteristic advantages and disadvantages of various strategic systems at each of the six successive hurdles mentioned earlier.

The *first hurdle* to be surmounted is the attainment of a stable, steady-state peacetime operation. systems which depend for their survival on extreme decentralization of controls, as may be the case with large scale dispersal and some of the mobile weapons, raise problems of accidents and over a long period of peacetime operation this leads in turn to serious political problems. Systems relying on extensive movement by land, perhaps by truck caravan, are an obvious example; the introduction of these on European roads, as is sometimes suggested, would raise grave questions for the governments of some of our allies. Any extensive increase in the armed air alert will increase the hazard of accident and intensify the concern already expressed among our allies. Some of the proposals for bombardment satellites may involve such hazards of unintended bomb release as to make *them* out of the question.

The cost to buy and operate various weapons systems must be seriously considered. Some systems buy their ability to negotiate a given hurdle -- say, surviving the enemy attack -- only at prohibitive cost. Then the number that can be bought out of a given budget will be small and this will affect the relative performance of competing systems at various other hurdles, for example penetrating enemy defenses. Some of the relevant cost comparisons, then, are between competing systems; others concern the extra costs to the enemy of canceling an additional expenditure of our own. For example, some dispersal is essential, though usually it is expensive; if the dispersed bases are within a warning net, dispersal can help to provide warning against some sorts of attack, since it forces the attacker to increase the size of his raid and so makes it more liable to detection as well as somewhat harder to coordinate. But as the sole or principal defense of our offensive force, dispersal has only a brief useful life and can be justified financially only up to a point. For against our costs of construction, maintenance and operation of an additional base must be set the enemy's much lower costs of delivering one extra weapon. And, in general, any feasible degree of dispersal leaves a considerable concentration of value at a single target point. For example, a squadron of heavy bombers costing, with their associated tankers and penetration aids, perhaps a half a billion dollars over five years, might be eliminated, if it were otherwise unprotected, by an enemy intercontinental ballistic missile costing perhaps sixteen million dollars. After making allowance for the unreliability and inaccuracy of the missile, this means a ratio of some ten for one or better. To achieve safety by *brute* numbers in so unfavorable a competition is not likely to be viable economically or politically. However, a viable peacetime operation is only the first hurdle to be surmounted.

At the *second hurdle* -- surviving enemy offense -- ground alert systems placed deep within a warning net look good against a manned bomber attack, much less good against intercontinental ballistic missiles, and not good at all against ballistic missiles launched from the sea. In the last case, systems such as the Minuteman, which may be sheltered and dispersed as well as alert, would do well. Systems involving launching platforms which are mobile and concealed, such as Polaris submarines, have particular advantage for surviving an enemy offense.

However, there is a *third hurdle* to be surmounted -- namely that of making the decision to retaliate and communicating it. Here, Polaris, the combat air patrol of B-52's, and in fact all of the mobile platforms -- under water, on the surface, in the air and above the air -- have severe problems. Long distance communication may be jammed and, most important, communication centers may be destroyed.

At the *fourth hurdle* -- ability to reach enemy territory with fuel enough to complete the mission -- several of our short-legged systems have operational problems such as coordination with tankers and using bases

close to the enemy. For a good many years to come, up to the mid-1960's in fact, this will be a formidable hurdle for the greater part of our deterrent force. The next section of this article deals with this problem at some length.

The *fifth hurdle* is the aggressor's long-range interceptors and close-in missile defenses. To get past these might require large numbers of planes and missiles. (If the high cost of overcoming an earlier obstacle -- using extreme dispersal or airborne alert or the like -- limits the number of planes or missiles bought, this limitation is likely to be penalized disproportionately here.) Or getting through may involve carrying heavy loads of radar decoys, electronic jammers and other aids to defense penetration. For example, vehicles like Minuteman and Polaris, which were made small to facilitate dispersal or mobility, may suffer here because they can carry fewer penetration aids.

At the *final hurdle* -- destroying the target in spite of the passive defenses that may protect it -- low-payload and low-accuracy systems, such as Minuteman and Polaris, may be frustrated by blast-resistant shelters. For example, five half-megaton weapons with an average accuracy of 2 miles might be expected to destroy half the population of a city of 900,000, spread over 40 square miles, provided the inhabitants are without shelters. But if they are provided with shelters capable of resisting pressures of 100 pounds per square inch, approximately 60 such weapons would be required; and deep rock shelters might force the total up to over a thousand.

Prizes for a retaliatory capability are not distributed for getting over one of these jumps. A system must get over all six. A serious study of the competing systems in the late Sixties, as I stressed earlier, will have to consider the fact that a sensible enemy will design his offense and his active and passive defense so as to exploit the known weaknesses of whatever systems we choose. This sort of game, as anyone who has tried it knows, is extremely difficult to analyze and necessitates caution in making any early judgment as to the comparative merits of the many competing systems. The one thing that is apparent on the basis of even a preliminary analysis is that getting a capability to strike second in the late Sixties means running a hard course.

I hope these illustrations will suggest that assuring ourselves the power to strike back after a massive thermonuclear surprise attack is by no means as automatic as is widely believed. What can we say then on the question as to whether general war is unlikely? The most important thing to say perhaps is that it doesn't make much sense to talk about whether general war is likely or not unless we specify a good deal else about the range of circumstances in which the choice of surprise attack might present itself to the Russians. Deterrence is a matter of comparative risks. How much the Soviets will risk in surprise attack will depend in part on the vulnerability of our future posture. These risks could be smaller than the alternative of not striking.

Would not a general thermonuclear war mean "extinction" for the aggressor as well as the defender? "Extinction" is a state that badly needs analysis. Russian fatalities in World War II were more than 20,000,000. Yet Russia recovered extremely well from this catastrophe. There are several quite plausible circumstances in the future when the Russians might be confident of being able to limit damage to considerably *less* than this number -- if they make sensible strategic choices and we do not. On the other hand, the risks of *not* striking might at some juncture appear very great to the Soviets, involving, for example, disastrous defeat in peripheral war, loss of key satellites with danger of revolt spreading -- possibly to Russia itself -- or fear of an attack by ourselves. Then, striking first, by surprise, would be the sensible choice for them, and from their point of view the smaller risk.

It should be clear that it is not fruitful to talk about the likelihood of general war without specifying the range of alternatives that are pressing on the aggressor and the strategic postures of both the Soviet bloc and the West. The balance is not automatic. First, since thermonuclear weapons give an enormous advantage to the aggressor, it takes great ingenuity and realism at any given level of nuclear technology to devise a stable equilibrium. And second, this technology itself is changing with fantastic speed. Deterrence will require an urgent and continuing effort.

V. THE USES AND RISKS OF BASES CLOSE TO THE SOVIETS

It may now be useful to focus attention on the special problems of deterrent forces close to the Soviet Union. First, overseas areas have played an important role in the past and have a continuing though less certain role today. Second, the recent acceleration of production of our intermediate range ballistic missiles and the negotiation of agreements with various NATO powers for their basing and operation have given our overseas bases a renewed importance in deterring attack on the United States -- or so it would appear at first blush. Third, an analysis can throw some light on the problems faced by our allies in developing an

independent ability to deter all-out attack on themselves and in this way it can clarify the much agitated question of nuclear sharing. Finally, overseas bases affect in many critical ways, political and economic as well as military, the status of the alliance.

Let me say something to begin with about the uses and risks of basing SAC bombers overseas, first, on the costs of operating at great range. Suppose we design a chemically fueled bomber with the speed and altitude needed to penetrate enemy defenses and we want it to operate at a given radius from target without refueling. The weight of such a bomber along with the cost of buying and operating it will increase at a growing rate with the length of the design radius. Or, taking a specific bomber with a fixed radius, the cost of extending its radius by buying and operating aerial tankers will also grow at an increasing rate, with additional air refuelings to extend radius. The state-of-the-art during the past decade or so has been such that this has meant a drastic rise in costs at distances less than those from bases well within the United States to targets well within Russia. Or, looked at another way, for a fixed budget this means a smaller number of bombers capable of operating from far off than from close in to Russia. Indeed, with the actual composition of our tanker and bomber force only a small proportion could be operated from the current continental United States base system to our Russian targets and back without *some* use of overseas bases. At the end of the last decade, overseas bases appeared to be an advantageous means of achieving the radius extension needed by our short-legged bombers, of permitting them to use several axes of attack, and of increasing the number of sorties possible in the course of an extended campaign. With the growth of our own thermonuclear stockpile, it became apparent that a long campaign involving many re-uses of a large proportion of our bombers was not likely to be necessary. With the growth of a Russian nuclear-delivery capability, it became clear that this was most unlikely to be feasible.

Our overseas bases now have the disadvantage of high vulnerability. Because they are closer than the United States to the Soviet Union, they are subject to a vastly greater attack by a larger variety as well as number of vehicles. With given resources, the Soviets might deliver on nearby bases a freight of bombs with something like 50 to 100 times the yield that they could muster at intercontinental range. Missile accuracy would more than double. Because there is not much space for obtaining warning -- in any case, there are no deep-warning radar nets -- and, since most of our overseas bases are close to deep water from which submarines might launch missiles, the warning problem is very much more severe than for bases in the interior of the United States.

As a result, early in the Fifties the U.S. Air Force decided to recall many of our bombers to the continental United States and to use the overseas bases chiefly for refueling, particularly post-strike ground refueling. This reduced drastically the vulnerability of U.S. bombers and at the same time retained many of the advantages of overseas operation. For some years now SAC has been reducing the number of aircraft usually deployed overseas. The purpose is to reduce vulnerability and has little to do with any increasing radius of SAC aircraft. The early B-52 radius is roughly that of the B-36; the B-47, roughly that of the B-50 or B-29. In fact the radius limitation and therefore the basing requirements we have discussed will not change substantially for some time to come. We can talk with comparative confidence here, because the U.S. strategic force is itself largely determined for this period. Such a force changes more slowly than is generally realized. The vast majority of the force will consist of manned bombers, and most of these will be of medium range. The Atlas, Titan, and Polaris rockets, when available, can of course do without overseas bases. (Though it should be observed that the proportion of Polaris submarines kept at sea can be made larger by the use of overseas-based submarine tenders.) This is not true of the Thor and Jupiter. But in any case, strategic missiles will be in the minority. Even with the projected force of aerial tankers, this means that most of our force, which will be manned bombers, cannot be used at all in attacks on the Soviet Union without at least some use of overseas areas.

We might distinguish varying degrees in the intensity of such use. (1) At one extreme overseas bases could be simply places to land bomber crews by parachute. (2) Or they might provide emergency landing facilities for the bombers returning from target. (3) They might support the landing of tankers after they have fueled the bombers and so permit the transfer of larger amounts of fuel. (4) They might be used to help stage the bombers back to the United States (possibly to be turned around for another sortie). (5) They might be used for staging bombers on the way to as well as from the target. (6) They might support one or two such "turn-arounds." (7) At the other extreme, they might support continuous operation up to the outbreak of the war. The last of these types of use (involving continuous close-in operation and exposure before the outbreak) is, of course, the most vulnerable. Five and six, which involve exposure intermittently only, and after the start of war, are less vulnerable but nonetheless problematic. In the case of the first four,

an attack on the base would not prevent the fulfillment by the bomber of at least a single mission of retaliation.

The essential point to be made is that to use the majority of our force will involve at least minimal employment of overseas areas for the early Sixties. In this period *some* U.S. bombers will be able to reach *some* targets from *some* U.S. bases within the original forty-eight states without landing on the way back. On the other hand, some bomber-target combinations are not feasible without pre-target landing (and are therefore doubtful). However, most of the bombers in the early Sixties will require some sort of touch down of the bomber or the tanker or both on the way back to the United States after fulfilling their mission. In this section we have been discussing what I listed earlier as the fourth hurdle, the problem of reaching enemy territory with fuel enough to complete the mission. This is clearly an important hurdle in the early Sixties. But how important is it that the majority of the U.S. force of strategic vehicles be able to surmount this obstacle? This depends essentially on how well the rest of the force, which does not have range extension problems, can get over each of the other five obstacles: for example, the problem of surviving attack on the continental United States and penetrating enemy passive and active defense. What I have said already will suggest that these difficulties are large enough to make one hesitate to throw away lightly a capability that might be obtained by some form of radius extension overseas. Some touch down overseas will remain useful to most U.S. bombers, which will make up the greater part of the deterrent force in the early Sixties. On the other hand, because these bases are within range of so large a proportion of Russian striking power and subject to attack with so little notice, their use by bombers will be severely limited in form.

What of the bases for Thor and Jupiter, our first intermediate range ballistic missiles? These have to be close to the enemy, and they must of course be operating bases, not merely refueling stations. (This is one of the many differences between the missile and the aircraft. Contrary to the usual belief, quite a few, though not all, of these differences favor the aircraft as far as ground vulnerability is concerned.) The Thors and Jupiters will be continuously in range of an enormous Soviet potential for surprise attack. These installations therefore re-open, in a most acute form, some of the serious questions of ground vulnerability that were raised about six years ago in connection with our overseas bomber bases. The decision to station the Thor and Jupiter missiles overseas has been our principal public response to the Russian advances in rocketry, and perhaps our most plausible response. Because it involves our ballistic missiles it appears directly to answer the Russian rockets. Because it involves using European bases, it appears to make up for the range superiority of the Russian intercontinental missile. And most important, it directly involves the NATO powers and gives them an element of control.

There is no question that it was genuinely urgent not only to meet the Russian threat but to do so visibly, in order to save the loosening NATO alliance. Our allies were fearful that the Soviet ballistic missiles might mean that we were no longer able or willing to retaliate against the Soviet Union in case of an attack on them. We hastened to make public a reaction which would restore their confidence. This move surely appears to increase our own power to strike back, and also to give our allies a deterrent of their own, independent of our decision. It has also been argued that in this respect it merely advances the inevitable date at which our allies will acquire "modern" weapons of their own, and that it widens the range of Soviet challenges which Europe can meet. But we must face seriously the question whether this move will assure either the ability to retaliate or the decision to attempt it, on the part of our allies, or ourselves. And we should ask at the very least whether further expansion of this policy will buy as much retaliatory power as other ways of spending the considerable sums involved. Finally, it is important to be clear whether the Thor and Jupiter actually increase the flexibility or range of response available to our allies.

One justification for this move argues that it disperses retaliatory weapons and that this is the most effective sanction against the thermonuclear aggressor. I have already anticipated this claim in my earlier discussion of the limitations of dispersal. At this point, however, it is useful to comment on one variant of the simple dispersal argument which is usually advanced in connection with overseas bases, namely that they provide a *widespread* dispersal and this in particular imposes insoluble problems of coordination. This argument needs examination. There is of course something in the notion that forcing the enemy to attack many political entities increases the seriousness of his decision. (However, (a) this can't be very persuasively argued as the justification for the IRBMs since they will add few if any new political entities to our current manned aircraft base system which would have to be attacked by the Russians in order to destroy our bombers; and, as we shall discuss, (b) where location in a foreign country means joint control, we may not be able to use the base in retaliation.) There is nothing on the other hand, or very little, in the notion that dispersal in several countries makes the problem of destruction more difficult in the military sense.

Dispersal to increase enemy force requirements does not involve separation by oceans -- just by the lethal diameters of enemy bombs. And the coordination problem referred to is very widely misunderstood. The critical part of the bomber coordination problem depends especially on the time spent within warning nets rather than simply the time of travel, and warning, as I have stressed, is difficult to come by, close to the Soviets. Moreover there is not very much difference for the enemy in the task of coordinating bomber attacks on Europe and the eastern coast of the United States, say, and the job of coordinating attacks on our east and west coasts. But in the case of an enemy ballistic missile attack is most illuminating. These missiles are launched vertically and, so to speak, do not care in which direction they are told to proceed -- their times on trajectory are eminently calculable and, allowing a cushion for failures and delays, times of firing can be arranged for near-simultaneous impact on many dispersed points, on Okinawa and the United Kingdom as well as on California and Ohio. Moreover, it is relevant to recall that these far-flung bases, while distant from each other and from the United States, are on the whole close to the enemy. They require for their elimination therefore a smaller expenditure of resources on the part of Russia than targets at intercontinental range. For close-in targets the Soviets can use a larger variety of weapons carrying larger payloads and with improved accuracies.

The seeming oppositeness of an overseas-based Thor and Jupiter as an answer to a Russian intercontinental ballistic missile stems not so much from any careful analysis of their retaliatory power under attack as from the directness of the comparison they suggest: a rocket with a rocket, an intercontinental capability with a base at closer range to the target. In this respect the ready optimism on the subject reflects the basic confusion, referred to at the beginning of this essay, as to the nature of the technological race. It conceives the problem of deterrence as that of simply matching or exceeding the aggressor's capability to strike first. A surprising proportion of the debate on defense policy has betrayed this confusion. Matching technological developments are useful for prestige, and such demonstrations have a vital function in preserving the alliance and in reassuring the neutral powers. But propaganda is not enough. The only reasonably certain way of maintaining a reputation for strength is to display an actual power to our friends as well as our enemies. We should ask then whether further expansion of the current programs for basing Thor and Jupiter is an efficient way to increase American retaliatory power. If overseas bases are considered too vulnerable for manned bombers, will not the same be true for missiles?

The basis for the hopeful impression that they will not is rather vague, including a mixture of hypothetical properties of ballistic missiles in which perhaps the dominant element is their supposed much more rapid, "push-button" response. What needs to be considered here are the response time of such missiles (including decision, preparation, and launch times), and how they are to be defended.

The decision to fire a missile with a thermonuclear warhead is much harder to make than a decision simply to start a manned aircraft on its way, with orders to return to base unless instructed to continue to its assigned target. This is the "fail-safe" procedure practiced by the U.S. Air Force. In contrast, once a missile is launched, there is no method of recall or deflection which is not subject to risks of electronic or mechanical failure. Therefore such a decision must wait for much more unambiguous evidence of enemy intentions. It must and will take a longer time to make and is less likely to be made at all. When more than one country is involved, the joint decision is harder still, since there is opportunity to disagree about the ambiguity of the evidence, as well as to make separate considerations of national interest. The structure of the NATO decision process on much less momentous matters is complicated, and it should be recognized that such complexity has much to do with the genuine concern of the various NATO powers about the danger of accidentally starting World War III. Such fears will not be diminished with the advent of IRBMs. In fact, the mere widespread dispersion of nuclear armed missiles raises measurably the possibility of accidental outbreak.

Second -- the preparation and launching time. It is quite erroneous to suppose that by contrast with manned bombers the first IRBMs can be launched almost as simply as pressing a button. Count-down procedures for early missiles are liable to interruption, and the cryogenic character of the liquid oxygen fuel limits the readiness of their response. Unlike JP-4, the fuel used in jet bombers, liquid oxygen cannot be held for long periods of time in these vehicles. In this respect such missiles will be *less* ready than alert bombers.

Third -- the warning available. My previous comments have suggested that warning against both manned bomber and ballistic or cruise missile attack is most difficult overseas in areas close to the enemy. But this is related also to a fourth problem, namely that of active defense. The less warning, the more difficult this problem is. And the problem is a serious one, therefore, not only against ballistic missile attacks but, for example, against low altitude or various circuitous attacks by manned aircraft.

And finally, passive defense by means of shelter is more difficult given the larger bomb yields, better accuracies and larger forces available to the Russians at such close range. And if the press reports are correct, the installations planned do not contemplate bomb-resistant shelters. If this is so, it should be taken into account in measuring any actual contribution to the United States retaliatory power. Viewed as a contribution to deterring all-out attack on the United States then, the Thor and Jupiter bases seem unlikely to compare favorably with other alternatives. If newspaper references to hard bargaining by some of our future hosts are to be believed, it would seem that such negotiations have been conducted under misapprehensions on both sides as to the benefits to the United States.

But many proponents of the distribution of Thor and Jupiter -- and possibly some of our allies -- have in mind not an increase in U.S. deterrence but the development of an independent capability in each of several of the NATO powers to deter all-out attack against themselves. This would be a useful thing if it can be managed at some supportable cost and if it does not entail the sacrifice of even more critical measures of protection. But aside from the special problems of joint control, which would affect the certainty of response adversely, precisely who their legal owner is will not affect the retaliatory power of the Thors and Jupiters one way or another. They would not be able to deter any attack which they could not survive. It is curious that many who question the capability of American overseas bases (for example, our bomber bases in the United Kingdom) simply assume that, for our allies, possession of strategic nuclear weapons is one with deterrence.

It remains to examine the view that the provision of these weapons will broaden the range of response open to our allies. The proponents do not seem to regard an addition of capability for NATO at the all-out end of the spectrum as the required broadening; but if they do, they are faced with the question previously considered: the actuality of this all-out response under all-out attack. Insofar as this view rests on the belief that the intermediate range ballistic missile is adapted to limited war, it is wide of the mark. The inaccuracy of the IRBM requires high-yield warheads, and such a combination of inaccuracy and high yield, while quite appropriate and adequate against unprotected targets in a general war, would scarcely come within even the most lax, in fact reckless, definition of limited war. Such a weapon is inappropriate for even the nuclear variety of limited war, and it is totally useless for meeting the wide variety of provocation that is well below the threshold of nuclear response. On the other hand, though a contribution of American aid, it may not be without cost to the recipient. Insofar as these weapons are expensive to operate and support they are likely to displace a conventional capability that might be genuinely useful in limited engagements. More important, they are likely to be used as an excuse for budget cutting. In this way they will accelerate the general trend toward dependence on all-out response and so will have the opposite effect to the one claimed.

Nevertheless, if the Thor and Jupiter have these defects, might not some future weapon be free of them? Some of these defects, of course, will be overcome in time. Solid fuels or storable liquids will eventually replace liquid oxygen, reliabilities will increase, various forms of mobility or portability will become feasible, accuracies may even come down to regions of interest in limited wars. But these are all years away. In consequence, the discussion will be advanced if a little more precision is given such terms as "missiles" or "modern" or "advanced weapons." We are not distributing a generic "modern" weapon with all the virtues of flexibility for use in a wide range of attacks and invulnerability in all-out war. Finally, even with advances in the state-of-the-art on our side, it will continue to be hard to maintain a deterrent, and even harder close in under the enemy's guns than further off. Some of the principal difficulties I have sketched will remain and others will grow. This is of particular interest to our allies who do not have quite the same freedom to choose between basing at intercontinental and point-blank range. The characteristic limitations of "overseas" basing concern them since, for the most part, unlike ourselves, they live "overseas."

It follows that, though a wider distribution in the ownership of nuclear weapons may be inevitable, or at any rate likely, it is by no means inevitable or even very likely that the power to deter an all-out thermonuclear attack by Russia will be widespread. This is true even though a minor power would not need to guarantee as large a retaliation as we in order to deter attack on itself. Unfortunately, the minor powers have smaller resources as well as poorer strategic locations.^[12] A multiplicity of such independent retaliatory powers might be desirable as a substitute for the principal current function of the alliance. But they will not be easy to achieve. Mere membership in the nuclear club might carry with it prestige, as the applicants and nominees expect, but it will be rather expensive, and in time it will be clear that it does not necessarily confer any of the expected privileges enjoyed by the two charter members. The burden of

detering a general war as distinct from limited wars is still likely to be on the United States and therefore, so far as our allies are concerned, on the alliance.

In closing these remarks on the special problems of overseas bases, it should be observed that I have dealt with only one of the functions of these bases: their use as a support for the strategic deterrent force. They have a variety of military, political and economic roles which are beyond the scope of this paper.

Expenditures in connection with the construction or operation of U.S. bases, for example, are a form of economic aid and, moreover, a form that is rather palatable to the Congress. There are other functions in a central war where their importance may be very considerable. In case deterrence fails, they might support a counterattack which could blunt the strength of an enemy follow-up attack, and so reduce the damage done to our cities. Their chief virtue here is precisely the proximity to the enemy which makes them problematic as a deterrent. Proximity means shorter time to target and possibly larger and more accurately delivered weapons -- provided, of course, the blunting force survives the first attack. This is not likely to be a high confidence capability of the sort we seek in the deterrent itself; but it might make a very real difference under some circumstances of attack, particularly if the enemy attack were poorly coordinated, as it might be if the war were started by an accident. In this case the first wave might be smaller and less well organized than in a carefully prepared attack. The chance of even some of our unprotected planes or missiles surviving would be greater. Moreover a larger portion of the attacker's force would remain on base, not yet ready for a following attack. Using some portion of our force not in retaliation but to spoil the follow-up raid by killing or at least disrupting the matching of bombers with tankers, bombers with bombers, bombers with decoys, and bombers with missiles could reduce both the number of attackers reaching our defenses and the effectiveness of their formation for getting through. It would be a fatal mistake to count on poor planning by an aggressor, but, given the considerable reduction in damage it might enable, it is prudent to have the ability to exploit such an error.

One caution should be observed. A force capable of blunting a poorly started aggression and equipped with information as to enemy deployments, might destroy a poorly protected enemy strategic force *before* the latter got started. Missiles placed near the enemy, even if they could not retaliate, would have a potent capability for striking first by surprise. And it might not be easy for the enemy to discern their purpose. The existence of such a force might be a considerable provocation and in fact a dangerous one in the sense that it would place a great burden on the deterrent force which more than ever would have to guarantee extreme risks to the attacker -- worse than the risks of waiting in the face of this danger. When not coupled with the ability to strike in retaliation, such a capability would suggest -- erroneously to be sure in the case of the democracies -- an intention to strike first. It would tend to provoke rather than to deter general war.

One final use for our overseas bases should be mentioned, namely their use to support operations in a limited war. Their importance here is both more considerable and likely to be more lasting than their increasingly restricted utility to deter attack on the United States. Particularly in conventional limited wars, destructive force is delivered in smaller units and, in general, requires a great number of sorties over an extended period of time. It is conceivable that we might attempt the intercontinental delivery of iron bombs as well as ground troops and ground-support elements. The problem of intercontinental versus overseas bombers is mainly a matter of costs, provided we have the time and freedom to choose the composition of our force and our budget size. But there would be enormous differences in costs between distant and close-in repeated *delivery* at a given rate of high explosives.

I hope that my focus so far on the critical problem of deterring central war has not led the reader to believe that I consider the problem of limited war either unimportant or soluble by use of the strategic threat. Quite the contrary is the case. In fact it would be appropriate to say something about the limitations as well as the necessity of strategic deterrence in this as well as other connections. But first let me sum up the uses and risks of bases close to the Soviet Union. These bases are subject to an attack delivering more bombs with larger yields and greater accuracies and with less warning than bases at intercontinental range. Whether they are under American command, or completely within the control of one of our allies or subject to joint control, they present the severest problems for the preservation of a deterrent force.

VI. THE INADEQUACY OF STRATEGIC DETERRENCE, AND ITS NECESSITY

The inadequacy of deterrence is a familiar story. Western forces at the end of the war were larger than those of the Soviet Union and its satellites. We demobilized much more extensively, relying on nuclear weapons to maintain the balance of East-West military power. This was plausible then because nuclear power was all on our side. It was *our* bomb. It seemed only to complete the preponderance of American

power provided by our enormous industrial mobilization base and to dispense with the need to keep it mobilized. It would compensate for the extra men kept under arms by the East.

But the notion of massive retaliation as a responsible retort to peripheral provocations vanished in the harsh light of a better understanding here and abroad that the Soviet nuclear delivery capability meant tremendous losses to the United States if we attacked them. And now Europe has begun to doubt that we would make the sacrifice involved in using SAC to answer an attack directed at it but not at ourselves.

The many critics of the massive retaliation policy who advocate a capability to meet limited aggression with a limited response are on firm ground in suggesting that a massive response on such an occasion would be unlikely and the threat to use it therefore not believed. Moreover this argument is quite enough to make clear the critical need for more serious development of the power to meet limited aggressions.

Another argument, which will not hold water and which is in fact dangerous, is sometimes used: Little wars are likely, general war improbable. We have seen that this mistakes a possibility for its fulfillment. The likelihood of both general and little wars is contingent on what we do. Moreover, these probabilities are not independent. A limited war involving the major powers is explosive. In this circumstance the likelihood of general war increases palpably. The danger of general war can be felt in every local skirmish involving the great powers. But because the balance of terror is supposed, almost universally, to assure us that all-out war will not occur, advocates of graduated deterrence have proposed to fix the limits of limited conflict in ways which neglect this danger. A few of the proposals seem in fact quite reckless.

The emphasis of the advocates of limitation has been on the high rather than on the low end of the spectrum of weapons. They have talked in particular of nuclear limited wars on the assumption that nuclear weapons will favor the defender rather than the aggressor and that the West can depend on these to compensate for men and conventional arms. Perhaps this will sound reminiscent to the reader. These are, evidently, *our* tactical nuclear bombs. I am afraid that this belief will not long stand the harsh light of analysis and that it will vanish like its predecessor, the comfortable notion that we had a monopoly of strategic nuclear weapons and that these only completed the Western and, specifically, the American preponderance. I know of no convincing evidence that tactical nuclear weapons favor the defender rather than the aggressor if both sides use such weapons. The argument runs that the offense requires concentration and so the aggressor necessarily provides the defender with a lucrative atomic target. This ignores the fact that, in a delivered nuclear weapon itself, the offense has an enormous concentration of force. The use of nuclear weapons in limited wars might make it possible for the aggressor to eliminate the existing forces of the defender and to get the war over, reaching his limited objective before the defender or his allies can mobilize new forces. Like all-out nuclear war it puts a premium on surprise and forces in being rather than on mobilization potential which is the area in which the West has an advantage.

I am inclined to believe that most of those who rely on tactical nuclear weapons as a substitute for disparities in conventional forces have in general presupposed a cooperative Soviet attacker, one who did not use atomic weapons himself. Here again is an instance of Western-preferred Soviet strategies, this time applied to limited war. Ironically, according to reports of Soviet tactical exercises described in the last few years in the military newspaper, *The Red Star*, atomic weapons are in general employed only by the offense, the defender apparently employing Soviet-preferred Western strategies.^[13] The symmetry of the optimism of East and West here could be quite deadly.

Whether or not nuclear weapons favor the west in limited war, there still remains the question of whether such limitations could be made stable. Korea illustrated the possibility of a conventional limited war which did not become nuclear, though fought in the era of nuclear weapons. It remains to be seen whether there are any equilibrium points between the use of conventional and all-out weapons. In fact the emphasis on the gradualness of the graduated deterrents may be misplaced. The important thing would be to find some discontinuities if these steps are not to lead too smoothly to general war. Nuclear limited war, simply because of the extreme swiftness and unpredictability of its moves, the necessity of delegating authority to local commanders, and the possibility of sharp and sudden desperate reversals of fortune, would put the greatest strain on the deterrent to all-out thermonuclear war.

For this reason I believe that it would be appropriate to emphasize the importance of expanding a conventional capability realistically and, in particular, research and development in non-nuclear modes of warfare. These have been financed by pitifully small budgets. Yet I would conjecture that if one considers the implications of modern surface-to-air missiles in the context of conventional war in which the attacker has to make many sorties and expose himself to recurring attrition, these weapons would look ever so much better than they do when faced, for example, with the heroic task of knocking down 99 percent of a wave of, say one thousand nuclear bombers. Similarly, advances in anti-tank wire-guided missiles and anti-

personnel fragmentation weapons, which have been mentioned from time to time in the press, might help redress the current balance of East-West conventional forces without, however, removing the necessity for spending more money in procurement as well as research and development.

The interdependencies of limited and total war decisions make it clear that the development of any powerful limited war capability, and in particular a nuclear one, only underlines the need, at the same time, for insuring retaliation against all-out attack. An aggressor must constantly weigh the dangers of all-out attack against the dangers of waiting, of not striking "all-out." Sharp reversals in a limited war can increase the dangers of waiting. But finally there is no question at this late date that strategic deterrence is inadequate to answer limited provocation.

Strategic deterrence has other inadequacies besides its limitations in connection with limited war. Some of these concern air defense. The power to deter a rational all-out attack does not relieve us of the responsibility for defending our cities in case deterrence fails. It should be said at once that such a defense is not a satisfactory substitute for deterring a carefully planned surprise attack since defense against such an attack is extraordinarily difficult. I know in fact of no high confidence way of avoiding enormous damage to our cities in a war initiated by an aggressor with a surprise thermonuclear attack. The only way of preventing such damage with high confidence is to prevent the war. But if we could obtain a leakproof air defense, many things would change. A limited war capability, for example, would be unimportant. Massive retaliation against even minor threats, since it exposed us to no danger, might be credible. Deterring attack would also not be very important. Of course if both sides had such defenses, deterrence would not be feasible either, but this again would be insignificant since strategic war would be relatively harmless -- at least to the targets on both sides if not to the attacking vehicles. It is a curious paradox of our recent intellectual history that, among the pioneers of both the balance of terror theory of automatic deterrence and the small nuclear weapon theory of limited or tactical war were the last true believers in the possibility of near perfect defense -- which would have made deterrence infeasible and both it and the ability to fight limited war unimportant. However, in spite of the periodic announcements of "technological breakthroughs," the goal of emerging unscathed from a surprise thermonuclear attack has gotten steadily more remote.

On the other hand, this does not mean that we can dispense with the defense of cities. In spite of deterrence a thermonuclear war could be tripped by accident or miscalculation. In this case, particularly since the attack might be less well planned, a combination of spoiling counterattacks and active and passive defenses might limit the size of the catastrophe. It might mean, for example, the difference between fifty million survivors and a hundred and twenty million survivors, and it would be quite wrong to dismiss this as an unimportant difference.

If strategic deterrence is not enough, is it really necessary at all? Many sensitive and serious critics of Western defense policy have expressed their deep dissatisfaction with the strategy of deterrence. Moreover, since they have almost all assumed a balance of terror making deterrence nearly effortless, their dissatisfaction with deterrence might very well deepen if they accept the view presented here, that deterrence is most difficult. Distaste for the product should not be lessened by an increase in its cost. I must confess that the picture of the world that I have presented is unpleasant. Strategic deterrence will be hard. It imposes some dangers of its own. In any case, though a keystone of a defense policy, it is only a part, not the whole. The critics who feel that deterrence is "bankrupt," to use the word of one of them, sometimes say that we stress deterrence too much. I believe this is quite wrong if it means that we are devoting too much effort to protect our power to retaliate, but I think it quite right if it means that we have talked too much of a strategic threat as a substitute for many things it cannot replace. Mr. Kennan, for example, rejects the bomb as salvation, but explicitly grants it a sorry value as a deterrent. (In fact he grants it rather more than I since in his policy of disengagement it seems that he would substitute a threat something like that of massive retaliation for even conventional American and English forces on the Continent.)

On the whole, I think the burden of the criticism of deterrence has been the inadequacy of a thermonuclear capability and frequently of, what is not really deterrence at all, the threat to strike first. But it would be a fatal mistake to confuse the inadequacy of strategic deterrence with its dispensability. Deterrence is not dispensable. If the picture of the world I have drawn is rather bleak, it could nonetheless be cataclysmically worse. Suppose both the United States and the Soviet Union had the power to destroy each others' retaliatory forces and society, given the opportunity to administer the opening blow. In this case, the situation would be something like the old-fashioned Western gun duel. It would be extraordinarily risky for one side not to attempt to destroy the other, or to delay doing so. Not only can it emerge unscathed by striking first; this is the only way it can have a reasonable hope of emerging at all. Such a situation is

clearly extremely unstable. On the other hand, if it is clear that the aggressor too will suffer catastrophic damage in the event of his aggression, he then has strong reason not to attack, even though he can administer great damage. A protected retaliatory capability has a stabilizing influence not only in deterring rational attack, but also in offering every inducement to both powers to reduce the chance of accidental detonation of war. Our own interest in "fail-safe" responses for our retaliatory forces illustrates this. A protected power to strike back does not come automatically, but it can hardly be stressed too much that it is worth the effort.

There are many other goals for our foreign as well as our military policy which have great importance: the strengthening of the alliance and of the neutral powers, economic development of the less advanced countries, negotiations to reduce the dangers of deliberate or accidental outbreak, and some attempts to settle the outstanding differences between the East and West. These other objectives of military and foreign policy are important and many of them are vital. But an unsentimental appraisal suggests no sudden change in prospect and in particular no easy removal of the basic East-West antagonisms. Short of some hard-to-manage peaceful elimination of the basic antagonisms, or a vast and successful program of disarmament, it would be irresponsible to surrender the deterrent. But in fact progress in disarmament too will be made easier if it is complemented by a defense against aggression.

VII. DETERRENCE, ACCIDENTS AND DISARMAMENT

A deterrent strategy is aimed at a rational enemy. Without a deterrent, general war is likely. With it, however, war might still occur. This is one reason deterrence is only a part and not the whole of a military and foreign policy.

In fact, there is a very unpleasant interaction. In order to reduce the risk of a rational act of aggression, we are being forced to undertake measures (increased alertness, dispersal, mobility) which, to a smaller extent but still significantly, increase the risk of an irrational or unintentional act of war. The accident problem, which has occupied an increasingly prominent place in newspaper headlines during the past year, is a serious one. It would be a great mistake to dismiss the recent Soviet charges on this subject as simply part of the war of nerves. In a clear sense the great multiplication and spread of nuclear arms throughout the world, the drastic increase in the degree of readiness of these weapons, and the decrease in the time available for the decision on their use must inevitably raise the risk of accident. Though they were not in themselves likely to trigger misunderstanding, the B-47 accidents this year at Sidi Slimane and at Florence, South Carolina, and the recent Nike explosion (of which an Army officer in the local command said, "A disaster which could not happen did.") suggest the problem. And they are just the beginning.

There are many sorts of accidents that could happen. There can be electronic or mechanical failures of the sort illustrated by the B-47 and Nike mishaps; there can be aberrations of individuals, perhaps, quite low in the echelon of command; and, finally, there can be miscalculations on the part of governments as to enemy intent and the meaning of ambiguous signals. (With the rising noise level of alarms on the international scene and the shortening of the time available for such momentous decisions, this possibility becomes more real; with the widespread distribution of nuclear weapons with separate national controls, it is possible that there will be separate calculations of national interest. These could indicate a cause for all-out war to some nation doing the calculating which, from our standpoint, would be quite inadequate. That is, from our standpoint, a "miscalculation.")

What I have said does not imply that all deterrent strategies risk accident equally. The contrary is the case. One of the principles of selecting a strategy should be to reduce the chance of accident, wherever we can, without a corresponding increase in vulnerability to a rational surprise attack. (The problem of obtaining warning of a surprise attack, deciding on a response and communicating the decision -- which last is especially acute for the mobile systems -- would be very much easier if we did not have to be concerned with both goals: to deter a rational act of war and to reduce the chance of its happening by accident.) This is the significance of the recently adopted "fail-safe" procedures for launching SAC which came to the public notice in connection with the U.N. debates last May. Such a procedure requires that bombers, flushed by some serious yet not unambiguous warning, return to base unless they are specifically directed to continue forward. If the alarm is false, the bombers will return to base even if there is a failure in radio communications. If the alarm was in response to an actual attack and some radio communications should fail, this failure would mean only a small percentage diminution of the force going on to target. The importance of such a procedure can be grasped in contrast with the alternative. The alternative was to launch bombers on their way to target with instructions to continue unless recalled. Here, in case of a false alarm and a failure in communications, the single bomber or handful of bombers that did not receive the

message to return to base might, as a result of this mistake, go forward by themselves to start the war. Of all the many poor ways to start a war, this would be perhaps the worst. Moreover, when one considers the many hundreds of vehicles involved, the cumulative probability of accidental war would rapidly approach certainty with repeated false alarms. Or the planes would have to be kept grounded until evidence of an attack was unambiguous -- which would make these forces more vulnerable and, hence, such an attack more probable. A fail-safe procedure extends the period for final commitment.

While "fail-safe" or, as it is now less descriptively called, "positive control" is of great importance, it by no means eliminates the possibility of accident. While it can reduce the chance of miscalculation by governments somewhat by extending the period of final commitment, this possibility nonetheless remains. The increased readiness of strategic forces affects the disarmament issues and therefore our allies and the neutral powers. Here it is important to recognize the obsolescence of some of the principal policies we have enunciated before the U.N. The Russians, exploiting an inaccurate United Press report which suggested that SAC started en masse toward Russia in response to frequent radar ghosts, cried out against these supposed Arctic flights. The United States response and its sequels stated correctly that *such flights had never been undertaken except in planned exercises -- and moreover would not be undertaken in response to such high false-alarm rate warnings*. We pointed out the essential role of quick response and a high degree of readiness in the protection of the deterrent force. The nature of the fail-safe precaution was also described. We added, however, to cap the argument, that if the Russians were really worried about surprise attack they would accept the President's "open skies" proposal. This addition, however, conceals an absurdity. Aerial photography would have its uses in a disarmament plan -- for example, to check an exchange of information on the location of ground bases. However, so far as surprise is concerned, the "open skies" plan would have direct use only to discover attacks requiring much more lengthy, visible, and unambiguous preparations than are likely today.^[14] The very readiness of our own strategic force suggests a state of technology which outmodes the "open skies" plan as a counter to surprise attack. Not even the most advanced reconnaissance equipment can disclose an intention from 40,000 feet. Who can say what the men in the blockhouse of an ICBM base have in mind? Or, for that matter, what is the final destination of training flights or fail-safe flights starting over the Pacific or North Atlantic from staging areas? The actions that need to be taken on our own to deter attack might usefully be complemented by bilateral arguments for inspection and reporting and, possibly, limitation of arms and of methods of operating strategic and naval air forces. But the protection of retaliatory power remains essential; and the better the protection, the smaller the burden placed on the agreement to limit arms and modes of operation and to make them subject to inspection. Relying on "open skies" alone to prevent surprise would invite catastrophe and the loss of power to retaliate. Such a plan is worthless for discovering a well prepared attack with ICBMs or submarine-launched missiles or a routine mass training flight whose destination could be kept ambiguous. A tremendous weight of weapons could be delivered in spite of it. Although it is quite hopeless to look for an inspection scheme which would permit abandonment of the deterrent, this does not mean that some partial agreement on inspection and limitation might not help to reduce the chance of any sizable surprise attack. We should explore the possibilities of agreements involving limitation and inspection. But how we go about this will be conditioned by our appreciation of the problem of deterrence itself.

The critics of current policy who perceive the inadequacy of the strategy of deterrence are prominent among those urging disarmament negotiations, an end to the arms race, and a reduction of tension. This is a paramount interest of some of our allies. The balance of terror theory is the basis for some of the more light-hearted suggestions: if deterrence is automatic, strategic weapons on one side cancel those of the other, and it should be easy for both sides to give them up. So James E. King, Jr., one of the most sensible writers on the subject of limited war, suggests^[15] that weapons needed for "unlimited" war are those which both sides can most easily agree to abolish, simply because "neither side can anticipate anything but disaster" from their use. "Isn't there enough stability in the 'balance of terror'," he asks, "to justify our believing that the Russians can be trusted -- within acceptable limits -- to abandon the weapons whose 'utility is confined to the threat or conduct of a war of annihilation'?"

Indeed if there were no real danger of a rational attack, then accidents and the "n-th" country problem seem the *only* problems. In fact, they are very prominent in the recent literature on the subject of disarmament. As I have indicated, they are serious problems and some sorts of limitation and inspection agreement could diminish them. Almost everyone seems concerned with the need to relax tension. However, relaxation of tension, which everyone thinks is good, is not easily distinguished from relaxing one's guard, which almost everyone thinks is bad. Relaxation, like Miltown, is not an end in itself. Not all danger comes from tension.

The reverse relation, to be tense where there is danger, is only rational. If there is to be any prospect of realistic and useful agreement, we must reject the theory of automatic deterrence. The size and degree of protection of our retaliatory forces in any limitation arrangement would in good part determine the size of the force that a violator would have to hide. If the agreed-on force were small and vulnerable, no monitorable scheme would be likely to be feasible. Most obviously "the abolition of the weapons necessary in a general or 'unlimited' war" would offer the most insuperable obstacles to an inspection plan since the violator could gain an overwhelming advantage from the concealment of even a few weapons. The need for a deterrent, in this connection too, is ineradicable.

VIII. SUMMARY

What can we say then, in sum, on the balance of terror theory of automatic deterrence? It is a contribution to the rhetoric rather than the logic of war in the thermonuclear age. In suggesting that a carefully planned surprise attack can be checkmated almost effortlessly, that in short we may resume our deep pre-Sputnik sleep, it is wrong and its nearly universal acceptance is terribly dangerous. Though deterrence is not enough in itself, it is vital. There are two principal points.

First, even if we can deter general war by a strenuous and continuing effort, this will not be the whole of a military, much less a foreign policy! Such a policy would not of itself remove the danger of accidental outbreak or limit the damage in case deterrence failed, nor would it be at all adequate for crises on the periphery. Moreover, to achieve deterrent balance will entail some new risks requiring insurance -- in any case, some foreign policy reorientation.

Second, deterring general war in both the early and late Sixties will be hard at best, and hardest both for ourselves and our allies wherever we use forces based near the enemy.

A generally useful way of concluding a grim argument of this kind would be to affirm that we have the resources, intelligence and courage to make the correct decisions. That is, of course, the case. And there is a good chance that we will do so. But perhaps, as a small aid toward making such decisions more likely, we should contemplate the possibility that they may *not* be made. They *are* hard, involve sacrifice, are affected by great uncertainties, concern matters in which much is altogether unknown and much else must be hedged by secrecy; and, above all, they entail a new image of ourselves in a world of persistent danger. It is by no means *certain* that we shall meet the test.

[1] I want to thank C. J. Hitch, M. W. Hoag, W. W. Kaufmann, A. W. Marshall, H. S. Rowen and W. W. Taylor for suggestions in preparation of this article.

[2] George F. Kennan, "A Chance to Withdraw Our Troops in Europe," *Harper's Magazine*, February 1958, p. 41.

[3] P.M.S. Blackett, *Atomic Weapons and East-West Relations*, Cambridge Univ. Press, 1956, p. 32.

[4] Joseph Alsop, "The New Balance of Power," *Encounter*, May 1958, p. 4. It should be added that, since these lines were written, Mr. Alsop's views have altered.

[5] *The New York Times*, September 6, 1958, p. 2.

[6] This is not a new error: in an interview with the press on December 3, 1941, Air Chief Marshal Sir Robert Brooke-Popham, Commander-in-Chief, Far East, for the British forces stated, "There are clear indications that Japan does not know which way to turn. Tojo is scratching his head." As Japan did not have a definite policy to follow, irrevocably, step-by-step, said Sir Robert, "there is a reassuring state of uncertainty in Japan." O. Dowd Gallagher, *Action in the East*, Doubleday, p. 94.

[7] General Pierre M. Gallois, "A French General Analyzes Nuclear-Age Strategy," *Réalités*, November, 1958, pp. 19-22, 70-71; "Nuclear Aggression and National Suicide," *The Reporter*, September 18, 1958, pp. 23-26.

[8] See footnote 12.

[9] Blackett, *op. cit.*, p. 34.

[10] *Ibid.*, p. 53.

[11] See, for example, "NATO, A Critical Appraisal," by Gardner Patterson and Edgar S. Furniss, Jr., Princeton University Conference on NATO, Princeton, New Jersey, June 1957, p. 32: "Although no one pretended to know, the hypothesis that one-third of the striking force of the United States Strategic Air Command was in the air at all times was regarded by most as reasonable."

[12] General Gallois argues that, while alliances will offer no guarantee, "a small number of bombs and a small number of carriers suffice for a threatened power to protect itself against atomic destruction." (*Réalités*, *op. cit.*, p. 71.) His numerical illustrations give the defender some 400 underground launching

sites (*ibid.*, p. 22 and *The Reporter, op. cit.*, p. 25) and suggest that their elimination would require between 5,000 and 25,000 missiles -- which is "more or less impossible" -- and that in any case the aggressor would not survive the fallout from his own weapons. Whether these are large numbers of targets from the standpoint of the aggressor will depend on the accuracy, yield and reliability of offense weapons as well as the resistance of the defender's shelters and a number of other matters not specified in the argument. General Gallois is aware that the expectation of survival depends on distance even in the ballistic missile age and that our allies are not so fortunate in this respect. Close-in missiles have better bomb yields and accuracies. Moreover, manned aircraft -- with still better yields and accuracies -- can be used by an aggressor here since warning of their approach is very short. Suffice it to say that the numerical advantage General Gallois cites is greatly exaggerated. Furthermore, he exaggerates the destructiveness of the retaliatory blow against the aggressor's cities by the remnants of the defender's missile force -- even assuming the aggressor would take no special measures to protect his cities. But particularly for the aggressor -- who does not lack warning -- a civil defense program can moderate the damage done by a poorly organized attack. Finally, the suggestion that the aggressor would not survive the fallout from his own weapons is simply in error. The rapid decay fission products which are the major lethal problem in the locality of a surface-burst weapon are not a serious difficulty for the aggressor. The amount of the slow decay products, strontium-90 and cesium-137, in the atmosphere would increase considerably more than the amounts that have been produced by the rather large number of megatons already detonated in the course of testing by the three nuclear powers. This might for example, if nothing were done to counter it, increase by many times the incidence of such relatively rare diseases as bone cancer and leukemia. However, such a calamity, implying an increase of, say, 20,000 deaths per year for a nation of 200,000,000 is of an entirely different order from the catastrophe involving tens of millions of deaths, which General Gallois contemplates elsewhere. And there are measures that might reduce even this effect drastically. (See The RAND Corporation Report R-322-RC, *Report on a Study of Non-Military Defense*, July 1, 1958.)

[13] I am indebted to an unpublished paper of Mr. Constantin Melnik for this reference.

[14] Aerial reconnaissance, of course, could have an indirect utility here for surveying large areas to determine the number and location of observation posts needed to provide more timely warning.

[15] James E. King, Jr., "Arms and Man in the Nuclear-Rocket Era," *The New Republic*, September 1, 1958.